Consciousness in Intentional Action

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The Role of Definitions in Libet-Style Experiments

As I pointed out in chapter 1, Libet-style experiments are typically taken to show that if subjects are asked to freely decide *when* to move or *what* movement to make, the conscious intention the subjects do have is too late to play a causal role. One suggestion is that even though we do not consciously initiate what we do, we might still be able to consciously veto this initial decision and freely decide *whether* to move. That is, we may still have *free won't*. In recent years, several experiments have been conducted to study this veto decision (Filevich et al., 2012; Filevich et al., 2013; Kühn, Haggard & Brass, 2009; Parkinson & Haggard, 2014). One of these studies was concerned with the question of whether this veto decision is free, and the results suggest that it is not (Filevich et al., 2013). Even if we decide to refrain from acting, it seems that the brain has made this decision, and not 'I'. Therefore, these researchers concluded that there is no free won't either.

To assess whether these findings really pose a threat to free will and show that causal explanations of what we do in terms of unconscious brain activity replace explanations in terms of conscious intentions, it is important to critically examine the definitions used in these experiments. Neuroscientists typically define and operationalize voluntariness first, and on the basis of the experimental results conclude whether the voluntary action or decision was free as well.[1] This is also the case for Filevich et al.'s (2013) experiment: subjects have to voluntarily decide to veto or not and, on the basis of the occurrence of unconscious neural precursors, it is concluded whether the decision was also free. The definitions of voluntariness and freedom are identical in all Libet-style experiments and have been criticized before (e.g., Mele, 2009; Schlosser, 2014).

However, by analyzing the free won't experiment, in this chapter I will show that the conditions for voluntariness and freedom are more stringent than these philosophers take

[1] This distinction is for example made by Haggard (2008). Voluntary action and deciding (also referred to as 'intentional' or 'self-generated,' or 'intentional inhibition' in the case of the veto decision) are defined in the neuroscientific literature without referring to the causal role of consciousness, but by pointing out the role of internal and external causes and the experience of control (e.g., Haggard, 2008, p. 934). Whether these actions and decisions are free depends on the role of conscious states and processes (e.g., Haggard, 2008, p. 941; Haggard & Libet, 2001, p. 47).

them to be. In particular, I will argue that because 1) the voluntary decision is (implicitly) operationalized as not caused by external or internal factors and 2) freedom is understood as uncaused causation, the experiments are designed in such a way that the conclusion that the brain 'decides' is almost unavoidable. This is because the only decisions subjects are allowed to make in these experiments are spontaneous and arbitrary decisions. Subjects had no reason to veto or not and could deliberate about what to do. What is more, even if the subjects did deliberate about what to do, the researchers would not interpret this as such. Because of this, I conclude that alternative definitions of voluntariness and freedom are necessary for neuroscientific experiments to provide a valuable contribution to the debate on free will and intentional action.

The chapter is structured as follows. After explaining the free won't experiment by Filevich et al. (2013) in section 1, I elaborate on the two underlying assumptions in the second and third section of the chapter: the definition of voluntary deciding and the relationship between conscious states and processes and freedom. In section 4, I substantiate my claim that, given these definitions, the conclusion that the brain 'decides' is almost unavoidable. Because of this, I assess alternative proposals for defining voluntariness in section 5, but I argue that they do not suffice. Section 6 concludes the chapter.

1. The Libet-Style Experiment on Free Won't

In general, neuroscientists take voluntary action to have three components: an agent can voluntarily decide when to act, what action to perform, and whether to act on the initial intention or urge (Brass & Haggard, 2007). The latter component, the voluntary veto decision, is studied by Filevich et al. (2013).[2] This veto decision is associated with self-control and is characterized as the "last-minute inhibition of an action that has been prepared and is ready for execution" (Filevich et al., 2013, p. 1). Previous studies have shown that both the 'when' and 'what' component of voluntary action can be predicted on the basis of preceding unconscious brain activity (e.g., Haggard & Eimer, 1999; Libet, 1985; Soon et al., 2008). Filevich et al. (2013) aim to find out whether this voluntary veto decision can be predicted on the basis of unconscious brain activity as well. If this is the case, the decision to veto is not free either. Then, in this line of reasoning, no aspect of our voluntary actions would be truly 'up to us'.

The study by Filevich et al. (2013) consisted of five experimental conditions: instructed rapid, instructed delayed, free-choice rapid (voluntary decision not to veto), free-choice delayed (voluntary decision to veto), and nogo trials. In the instructed rapid condition subjects had to press a key as quickly as possible, and in the instructed delayed condition they had to press it with the 'shortest possible delay'. More important are the two free-choice conditions, in which the subjects were not instructed whether to act rapidly or delayed. Rather, they

[2] In fact, in Filevich et al.'s study (2013) subjects did not have to refrain from acting altogether, but had to decide to either act immediately or to delay their response. In this chapter, I will ignore possible problems with this aspect of the experimental design.

were instructed to choose for themselves what to do. In these free-choice conditions, subjects were asked to produce about 50% rapid and 50% delay responses (Filevich et al., 2013, p. 4). Furthermore, the subjects were discouraged from taking the decision at the onset of the trial, because in that case it would not be a veto decision. Subjects first had to acquire the urge or intention to move and actually prepare to make the movement. The later decision whether to act on this urge or intention should be spontaneous and not prepared in any way.[3]

The goal of the experiment was to find out whether on the basis of preceding neural activity this decision to veto or not in the free-choice conditions could be predicted. By comparing prior neural activity for free delayed and free rapid responses, Filevich et al. (2013) found a significant difference in neural activity preceding the instruction and the decision to act either rapidly or delayed. When the subjects voluntarily chose to respond rapidly, stronger preparatory activity was found compared to their decision to delay. From this the researchers concluded that in the free-choice conditions the conscious 'I' did not initiate the decision either, since their results identified "a candidate unconscious precursor of the decision to inhibit action" (Filevich et al, 2013, p. 10). Thus, even though conscious awareness of the intention or urge to move has played some role in the subsequent decision that is made, Filevich et al. take the voluntary veto decision to be triggered by the brain and, therefore, not free.

In the next two sections of this chapter I examine the definitions of voluntariness and freedom that are used in this experiment and the conclusion that is drawn.

2. Voluntary Deciding: Internally Generated or Underdetermined?

In this section, I focus on the definition of voluntariness that is used in experiments on the veto decision (and in all other Libet-style experiments). In his 2014 paper, Schlosser addresses this definition in which, according to him, a problematic distinction is made between internal and external factors that influence the action and decision. In their explicit definition of voluntary action, neuroscientists make a distinction between internal factors and external factors that influence what we do, and assume that voluntary actions should be the result of internal factors only. Schlosser argues that it is not relevant whether these contributing factors are internal or external, what matters is that the agent acted for reasons. Even though I agree with Schlosser's point and this is the way neuroscientists explicitly define voluntariness, I show in this section that deciding voluntarily is implicitly operationalized by excluding from the experimental setting *all* possible factors that may play a role. Because of this, making a voluntary veto decision amounts to subjects deciding what to do without being allowed to take

[3] Mele (2008) analyzed Brass and Haggard's (2007) study and concluded that it is not clear what strategies participants are actually using in the experiments. Because of that, it is unclear whether the participants really are deciding not to act on an intention they acquired. For the purposes of this paper, I assume that the experiment actually targets veto decisions and that subjects are able to and are in fact doing what is asked of them. My goal is to critically examine the assumptions that play a central role in the experiment and in the conclusion that is drawn.

any factor or reason into account.

Let me start with the explicit definition. In neuroscientific experiments on the veto decision, Libet's (1985) definition of voluntary action is taken as a starting point. As he states:

> (a) [the voluntary action] arises endogenously, not in direct response to an external stimulus or cue; (b) there are no externally imposed restrictions or compulsions that directly or immediately control subjects' initiation and performance of the act; and (c) most important, subjects *feel* introspectively that they are performing the act on their own initiative and that they *are free* to start or not to start the act as they wish. (pp. 529-530).

Also in these more recent studies on the veto, internal (or endogenous) generation is central: "the process or signal that cancels or inhibits the action is not the result of any external signal or instruction, but is generated internally by the subjects themselves" (Filevich et al., 2012, p. 1108). Neuroscientists in the field link the veto decision to self-control, i.e., the ability to postpone the immediate gratification of a desire to act to achieve other benefits, which, in the case of a *voluntary* decision, should not be the direct result of an external trigger but generated internally (Kühn et al., 2009, pp. 2834-2835).[4]

Thus, a decision to veto should not be directly caused by an external trigger, the process that inhibits the action should be generated internally, and the person should experience control in order for the decision to be voluntary. In the remainder of the chapter I will refer to this explicit definition of the voluntary veto decision as *internal generation*. Of course, it is still quite vague what 'directly' means here, or even 'generated internally'. Unfortunately, this is not specified in more detail by the researchers. Also, this definition still allows for many different ways in which a voluntary decision to veto can be made: it could be a decision based on my beliefs, desires, goals, or perhaps because it is my spontaneous decision to do so. For example, I can decide to refrain from reaching for a cup of coffee, because (a) I feel I do not want more coffee, (b) I decided to drink less coffee a couple of days ago, or (c) refraining from reaching for the cup was a spontaneous decision. According to the explicit definition held by neuroscientists, my decision to veto is voluntary in all three cases: the decision is not the direct result of an external trigger, it is generated internally, and I experience control over my decision – I feel that I could have reached for it anyhow had I decided to do so.

However, in the experiments the subjects had to decide to veto (or not) their initial urge or intention in circumstances that were much more restricted. The subjects had to wait for an intention or urge to move to emerge and then decide spontaneously, without preplanning, to veto or not. No external factors were present or changed to make sure that they could

[4] Examples that are used are refraining from sending an angry email (Filevich et al., 2012), overcoming cigarette addiction (Kühn et al., 2009), acting in socially desirable way (Filevich et al., 2013), or resisting criminal activities (Parkinson & Haggard, 2014).

not causally contribute to the decision that was made.[5] Furthermore, and this is where the discrepancy between the explicit definition and the implicit operationalization becomes clear, the experiments are conducted in such a way that no *internal* triggers or factors were manipulated, measured, or allowed to play a role either. There was no goal to be reached or desire to be met by making the movement or deciding to veto, and the subjects were not allowed to let goals or desires play a role. They were told not to preplan what they were going to do, and to decide spontaneously. Furthermore, the frequency of vetoing and not vetoing was supposed to be more or less equal, and subjects were not allowed to use strategies to achieve this equality. Thus, the researchers attempted to exclude from the experimental setting all possible influences on the decision, external *and* internal, in the sense that goals, desires, or beliefs were not allowed to contribute to the decision that was made. That means that, in line with this implicit operationalization, only (c) counts as a voluntary veto decision.

Schüür and Haggard (2011) refer to these actions and decisions as they are actually studied in the experiments as *underdetermined*, which I also use here for these kinds of decisions.[6] As they (p. 1699) state, this operationalization seems to be based on our experience that sometimes 'I' am the cause of my decisions and actions, instead of internal or external factors. By leaving all cues or factors that could count as reasons for action out of the experimental setting, the decision emerges from the self, "a source other than external or internal cues" (Schüür & Haggard, 2011, p. 1699). In giving subjects such a task, it seems that the researchers tried to capture this intuition that sometimes I can decide what to do without being influenced. Thus, only spontaneous and arbitrary decisions that are not based on any reason, either internal or external, count as voluntary on this definition. And this is the kind of decision that is the object of study in Libet-style experiments.

To conclude, the descriptions and examples in the literature in principle allow internal factors such as beliefs or desires to play a role in the decision the subjects have to make. However, the explicit definition and implicit operationalization differ. This means that Schlosser (2014) is not capturing the implicit operationalization that is in fact used. The problem is not that neuroscientists in the field distinguish between internal and external factors and whether they play a role in what agents do, but that the subjects are not allowed to take external *or* internal factors into account.

3. Free Won't: Conscious Causation or Uncaused Conscious Causation?

In this section I examine the definition of freedom that is central in conclusions drawn from

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[5] Kühn et al. (2009) did integrate external cues in their experiment, because previous studies on the veto "lacked the context of reasons for performing and inhibiting action that generally exist outside the laboratory" (p. 2835). However, the subjects were not allowed to decide on the basis of these reasons whether to veto or not. Later in the chapter it will become clear why this is important.

[6] Schüür and Haggard (2011) also criticize this description. I use the remarks from their paper only to clarify what underdetermined decisions are, and what the rationale is behind operationalizing voluntariness this way.

Libet-style experiments. Based on these conclusions and the claims made in the literature, I show that neuroscientists in the field do not think that a causal role for conscious states is sufficient for a decision to be free. Instead, the decision, for example to veto, should be an uncaused conscious cause, and should not be part of a causal chain that started unconsciously.

The results of Libet-style experiments are sometimes used as evidence for the claim that conscious processes and states play no causal role at all. For example, Libet concludes that the brain has already made the decision when to move (Libet, 1985, p. 536), and our conscious intention to move merely 'bubbles up' from our brain (Libet, 1999, p. 54). This finding, that the conscious intention is "a consequence or correlate of neural preparation of action," is interpreted as a threat to free will (e.g., Haggard & Libet, 2001, p. 46). It is concluded from this that our conscious intention has no causal role to play; the neural process is sufficient for the movement to occur. This is how Wegner (2002, p. 58) interprets these findings: we might experience that we consciously cause movements, but in fact unconscious brain activity causes both what we do and our conscious intentions. This way, conscious intentions are conceived as epiphenomena: inefficacious end products of brain activity that do not play a role in bringing about our movements. It is important to argue that this conclusion, that conscious intentions are epiphenomena, does not follow from the experiments as for example Mele (2009, chapter 4) argues.

However, from the recent discussions and experiments on free won't, it is clear that even if conscious states or processes play a causal role, this is not taken to be sufficient to conclude that the voluntary decision was a free decision as well. If we assume that subjects do as they are told in the experiments, conscious processes play a causal role in the voluntary veto decision. Subjects first have to become conscious of the urge or intention to move before they can decide to veto, they have to have "the experience of being about to commit an action" (Filevich et al., 2012, p. 1107). Furthermore, Filevich et al. (2013) explicitly state that there is a conscious decision involved in the experiment: "[t]he current state of the brain appears to influence the conscious decision to act or inhibit/delay, rather than vice versa" (p. 8). Thus, if it were sufficient for a decision to be free that conscious states or processes played a causal role, the voluntary veto decision would be free. However, it turns out that it is not sufficient. Even if conscious states or processes played a causal role, "a stronger rejection of 'free won't' could come from actually showing that a decision to act or not can be driven by a preceding, presumably unconscious neural activity" (Filevich et al., 2013, p. 10). If there is this preceding unconscious neural activity, the brain would still 'decide' whether we are going to act on our initial conscious intention or not.

Based on the results of Filevich et al. (2013), the veto decision is understood as initiated by unconscious neural activity and is therefore not free, even though conscious awareness of the intention or urge to move has to play some role in the subsequent decision that is made. Neuroscientists seem to assume that for a decision to be free it has to be an uncaused cause, a decision made by a conscious self that exists separate from the brain, for which no predictive neural correlates may be found. Filevich et al. (2013, p. 10) express this intuition by stating that

their "results suggest that an important aspect of 'free' decisions to inhibit can be explained without recourse to an endogenous, 'uncaused' process: the cause of our 'free decisions' may at least in part, be simply the background stochastic fluctuations of cortical excitability."

Thus, the veto decision would only be free, according to neuroscientists' definition of freedom, if the decision is an uncaused conscious cause, which means in this case that what subjects do cannot be predictable on the basis of preceding unconscious neural processes. That means that arguing that these experiments do not show that conscious states do not play a causal role, as Mele (2009, chapter 4) does, does not fully target the stronger assumption that underlies the conclusion that is drawn from the experiment.

4. What Underdetermined, Uncaused Conscious Decision-Making Amounts To

In this section my main aim is not to criticize the definitions of voluntariness and freedom that I put forth in the previous sections. Rather, I will argue that because of these underlying assumptions and given this experimental setting, the conclusion that the brain 'decides' is almost unavoidable. I start this section by showing that those who take the findings in Libet-style experiments seriously, philosophers, and 'the folk' think that (consciously) acting for and responding to reasons is central to free will. After that I provide three arguments for why the threat, that actions are not the result of reasons or reasoning processes and that instead the brain 'decides,' emerges from the experiments because of the definitions of voluntariness and freedom that are held. With these definitions in place, it is impossible for the subjects to be conceived as acting for reasons. Only spontaneous and arbitrary decisions, that are not based on any reason nor caused in any way, count as free.

In general, Libet-style experiments, including the one conducted by Filevich et al. (2013) on free won't, are taken to be threatening to free will because they seem to show that our conscious agency is bypassed. It seems that we do not consciously decide what to do, but in reality our brain made the decision for us. For example, Caruso (2012) takes the finding that decisions and actions have unconscious neural precursors "to be a serious threat to our intuitive sense of free will" (p. 194). He argues that our intuitive, commonsense conception of free will involves a central role for consciousness, mainly because consciousness is generally associated with our abilities as agents to deliberate and guide our actions and decisions. Since Libet-style experiments are taken to show that our conscious decisions are triggered unconsciously, it seems that these abilities cannot and do not make a difference to the decision that is made. Free will theorists also take the ability to respond to and act for reasons to be a central aspect of free will (see, e.g., Mele, 2003, p. 212; Schlosser, 2014). And this also seems to be what 'the folk' take to be problematic. For example Nahmias (2006, p. 217) states, on the basis of his surveys on folk intuitions about free will, that "any thesis that suggests our actions are caused by processes that bypass our conscious mental life – that bypass *us*, as it were – is intuitively threatening to freedom and responsibility." Thus, what we take to be threatening to

free will is that our ability to act for and respond to reasons, that we generally associate with consciousness, may not play a role in what we do.

However, concluding that these experiments show that our conscious agency is bypassed in situations other than these experiments is problematic for a couple of reasons. Recall that subjects in the experiments had to decide to veto or not in a situation in which (a) the only factor involved in the decision was the urge to make a preset movement based on the researchers' instructions (and perhaps an urge or inclination to veto or not) and (b) the decision to veto or not had to be an uncaused conscious cause, or in other words, not be predictable on the basis of unconscious brain activity. The problem is that this setting almost unavoidably leads to the conclusion that the brain 'decides' and that conscious deliberation and intending is bypassed. I will provide three arguments for this claim.

First, because there was nothing to consciously deliberate about in the experimental setting, subjects had to make *underdetermined* voluntary veto decisions. The experiment was designed in such a way that subjects prepared the movement and probably acquired a conscious urge or intention to move.[7] However, since the experimenters' goal was to exclude all external and internal cues from the experimental setting, that urge to move was the only factor that could have played a role in the decision to veto or not. This means that there is simply nothing to deliberate about, and thus deliberation could not make a difference to the outcome.[8]

Second, even if subjects did use their deliberative capacities (though they were not supposed to because the decision should be underdetermined), the related brain activity would not be interpreted as reflecting conscious decision-making or deliberation, but as unconscious neural precursors of the decision. If I would have been a subject in these experiments and I found it hard to decide whether to veto or not, I might have invoked a certain rhythm in my responses, for example on the basis of musical notes of my favorite song ('C' is veto, 'D' is not, etc.). Probably, brain activity predictive of my decision would have been found. Importantly, this brain activity would be interpreted as an unconscious precursor of my decision by the researchers, while in reality it was the neural realizer of my conscious efforts to remember the musical notes of the song and make decisions on the basis of that. But since the subjects were asked not to do this and they do not report on these processes, the researchers will assume that this neural activity is unrelated to conscious processes. Thus, if the subjects reasoned about what to do and exercise abilities that we associate with free will, this still would be interpreted as evidence that the decision was *not* free. Even more, on the basis of the definition of voluntariness that is held in the experiments, even if it was acknowledged that the subject decided on the basis of the song, the decision would not count as free. It would be a decision

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[7] As said, Mele (2008) argued that this might not be what actually happens, see footnote 3.

[8] This point, often put as Libet-style experiments being about the liberty of indifference, has been made before in the literature, see for example Mele (2009, p. 84). My aim is not to criticize this definition of freedom directly, but to show that because of this definition it is almost impossible to conclude from the experiments that we are free.

that is based on internal factors, and therefore not voluntary nor free.

Third, by taking away all factors that the decision to veto or not could be based on, it is not unlikely that subjects more or less 'let their brain make the decision'. By not allowing any possible influence on the decision that is made, no factor is left in the experimental setting other than brain fluctuations and possibly related urges or inclinations. This is also what the researchers themselves state: "[i]n the absence of any external cause to act rapidly or inhibit, we hypothesized that some other factors, such as transient fluctuations in subjects' brain states, may be relevant to their decision in this case" (Filevich et al., 2013, pp. 1-2). Also, conscious states and processes are interpreted by the researchers as playing a causal role only if they change something in the outcome of the experiment. But since the subjects were not allowed to take any factors into account in this decision, it is difficult to conceive of a way in which subjects would 'disrupt' the relations between the predictive brain activity and the decision, if there is only this urge to decide and act on. Then, it seems unavoidable that predictors will be found.

Because of these limitations, the question is what the result of the experiment should be for the researchers to conclude from it that the veto decision *is* free. This would not have much to do with conscious deliberation, but rather amount to a spontaneous and arbitrary decision that is not based on reasons nor caused in any way. The conclusion that the conscious self decides instead of the brain would be drawn only if no previous brain activity was found that correlated with the conscious decision that was made, and no reasons were taken into account. Then, conscious intentions have to appear out of nowhere.

To conclude, the experimental setting of Libet-style experiments forces subjects to decide to veto or not without allowing them to actually deliberate about what to do. Furthermore, if the subjects did deliberate, it would not be interpreted as such by the researchers. Because of this, conducting experiments with these definitions of voluntariness and freedom in place almost unavoidably leads to the conclusion that the brain 'decided' and not the conscious self. It leads to a distorted picture of the difference that our abilities as conscious agents can actually make. This means that alternative definitions of voluntariness and freedom are necessary for neuroscientific experiments to provide a valuable contribution to the debate on free will and free won't.

5. Alternative Definitions of Voluntariness and Freedom

The question is whether voluntary and/or free decisions can be defined in such a way that they can be studied experimentally. This question is not new, since neuroscientists also think that defining voluntariness as underdetermined is problematic (e.g., Nachev & Husain, 2010; Schüür & Haggard, 2011). In the neuroscientific literature on this topic, two alternative conceptions of voluntariness have been proposed: operant action and acting on the basis of complex integration. The central idea in both definitions is that voluntary actions and decisions should not be caused directly by external triggers or at least should not be "uniquely

specified by external cues" (Schüür & Haggard, 2011, p. 1698). In this section, I examine these proposals and point out some limitations. Furthermore, I elaborate on the fact that the definition of freedom seems to be generally accepted among neuroscientists in the field.

Schüür & Haggard (2011) use the term 'operant action' to refer to definitions of voluntariness that emphasize internal generation. The aim with this kind of definitions is to distinguish voluntary action from respondent action, by emphasizing that in case of operant action the subject is not directly responding to external cues. Proposals of Passingham and Lau (2006) and Filevich et al. (2012) fit this category. Passingham and Lau describe voluntary choice as "choices that are not imposed on the subject by an external agent" (p. 53). In a similar vein, Filevich et al. (2012) state that voluntary veto decisions are decisions that are internally generated: "[b]y definition, the process or signal that cancels or inhibits the action is not the result of any external signal or instruction, but is generated *internally* by the subject themselves" (p. 1108) The idea is that when internal factors bring about the actions, they depend "on wide integration of information beyond the current stimulus, such as memory of previous experience and predictions of future outcomes" (Filevich et al., 2012, p. 1116). A different proposal comes from Schüür and Haggard (2011): voluntary actions (and decisions) should be seen as "the motor consequences of processing and integrating large numbers of qualitatively different types of input" (p. 1702). For example, a soccer player has to integrate many inputs and strategically respond to them during a game. They propose that in order to study voluntary action and decision-making in a better way, what is needed is not a reduction of the number of external inputs, but rather an increase of the number of different types of inputs (Schüür & Haggard, 2011, pp. 1702-1703). Then, 'everything' is the cause of self-generated actions and decisions.

However, these definitions still allow for many different interpretations. Does 'internal generation' mean that also 'actions' and 'decisions' that are spontaneously generated from my brain are voluntary? Or is it limited to actions and decisions that have causes internal to the conscious self? In the first case, behaviors or inhibitions of actions that are the result of seizures are also included. In the last case, many questions remain: does that mean that we have to be conscious of the factors that we base the choice on, or is it necessary that conscious deliberation took place? For example, I can be conscious of my heartbeat, but that does not mean that I can make a (effective) choice about it. Furthermore, my conscious deliberation can be influenced by factors that I am not aware of. How should we treat these cases? And why can't we allow for 'simple' decisions, which are not the result of complex integration, to be voluntary?

I think that the general problem with these definitions is that the researchers do not make a distinction between intentional actions and behavior. Philosophers generally consider intentional actions and decisions to be special because we, as agents, play an active role in their outcome. What we decide and do is not merely a product of causal 'blind' forces, but the result of reasons, intentions, and deliberation. Because of that, we can effectively respond to facts and circumstances in a way that we find reasonable or justified. However, the alternative

definitions of what it means to act voluntarily that neuroscientists provide, do not capture this essential distinction between bodily movements that are the result of "blind" causation and intentional actions that are done for reasons.

Furthermore, it is interesting that the understanding of free will is not questioned in the neuroscientific literature. In most conceptions of free will, it is assumed that for a decision to be free it has to be caused by a conscious self that exists separate from the brain, and that is why neuroscientists tend to reject its existence (see, e.g., Haggard, 2008). However, neuroscientists typically do not argue for this definition of free will. Furthermore, their understanding of free will does not seem to track folk intuitions about free will (see for an overview of conducted surveys Mele, 2012). Thus, the burden of proof is on those that defend a supernatural or substance dualist account of free will, which are in this case the neuroscientists that study it.

6. Conclusion

To conclude, the definitions and operationalizations of voluntariness and freedom that are currently used in Libet-style experiments are problematic. They lead to an experimental setting in which the researchers almost inevitably come to the conclusion that the brain 'decides'. This is because the only decisions subjects are allowed to make in these experiments are spontaneous and arbitrary decisions that are not based on reasons, and because the researchers conceive of freedom as uncaused conscious causation. Furthermore, even if the subjects acted for reasons or deliberated about what to do, it would not be interpreted as such. Alternative definitions of voluntariness and freedom are necessary for neuroscientific experiments to provide a valuable contribution to the debate on free will and free won't. In order to do so, they should at least acknowledge that a central aspect of free will is whether the agent acts intentionally and for reasons. For now, the question to what extent neuroscience can contribute to our understanding of free will is open.

Having established that the experimental design plays a large and problematic role in concluding from Libet-style experiments that what agents do is exclusively caused by unconscious neural processes, an interesting question is whether these neuroscientific experiments allow for the conclusion that at least sometimes and perhaps even in Libet-style experiments what we do is caused by conscious intentions. This will be the topic of the next chapter.